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EXAMINER	
ODOM, CURTIS B	

ART UNIT	PAPER NUMBER
2611	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)
	10/670,982	KRUPKA, EYAL
	Examiner	Art Unit
	Curtis B. Odom	2611

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *27 March 2007*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *5,6,8-13,15,17-19,21,22,24-26 and 28-31* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *5, 6, 8-13, 15, 17-19, 21, 22, 24-26, and 28-31* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Response to Arguments

1. Applicant's arguments with respect to claims 5, 6, 8-13, 15, 17-19, 21, 22, 24-26, and 28-31 have been considered but are moot in view of the new ground(s) of rejection.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

3. Claims 5, 6, 8, 9, 30, and 31 are rejected under 35 U.S.C. 103(a) as being unpatentable over Corbaton et al. (previously cited in Office Action 1/17/2007) in view of Driesen et al. (previously cited in Office Action 1/17/2007) in view of Zvonar (previously cited in Office Action 1/17/2007) and in further view of Blanksby et al. (U. S. Patent No. 6, 744, 814).

Regarding claim 5, Corbaton et al. discloses a method comprising:

receiving (section 0034) a first signal including at least one known pilot symbol;

performing equalization (section 0049) on the first signal to form at least one soft estimated symbol; and

remodulating (see section 0050) the at least one estimated symbol to form a second signal; and

performing channel decoding (see sections 0049-0050).

Corbaton does not disclose estimating a DC level of the first signal; remodulating the at least one estimated symbol to form a second signal; re-estimating the DC level by comparing the first signal and the second signal; calculating an initial DC estimation error by comparing estimates of the DC level of the first signal and re-estimates of the DC level; weighting the at least one estimated symbol, wherein weighting comprises reducing a weight when the initial DC estimation error is above a threshold.

However, Driesen et al. discloses estimating a DC level of a received signal in a DC estimator (see Fig. 3, block 330), wherein a DC offset is determined by comparing the DC level of the received signal to a DC level of a re-modulated version of the demodulated (estimated) signal (see section 0026). Driesen et al. further discloses re-estimating a DC level (estimating a DC offset) by comparing the DC level of the received signal to a DC level of a re-modulated version of the demodulated (estimated) signal (see section 0026). Driesen et al. also discloses compensating (weighting) signals to correct for DC offset using DC offset estimation (see sections 0043-0044). It would have been obvious to one skilled in the art to modify Corbaton with the teachings of Driesen et al. since Driesen et al. states DC offset estimation can lead to the reduction of distortion due to DC offset (see column 0007).

Zvonar further discloses calculating an initial DC offset estimate for a burst and then re-estimating (upadating) the DC offset estimate for each burst by means of an error function (see section 0077). Zvonar further discloses calculating a DC offset estimation error by analyzing

(comparing) 1000 bursts (see section 0095). Therefore, it would have been obvious to one skilled in the art at the time the invention was made to calculate an estimation error in Corbaton et al. and Driesen et al. using DC offsets and updated (re-estimated) DC offsets of bursts as disclosed by Zvonar since Zvonar states calculating an estimation error can quantify a performance improvement (see section 0095).

Blanksby et al. further discloses reducing weighting of a received signal in a filter by reducing the coefficients (weights) applied to the signal when a channel quality metric (such as DC offset) is above a predetermined threshold, which indicates a high quality channel (see column 20, lines 63-67). Therefore, it would have been obvious to one skilled in the art at the time the invention was made to modify the weighting of Corbaton et al., Driesen et al. and Zvonar with the weighting of Blanksby et al. to reduce power consumption in the device (see column 20, lines 47-67).

Regarding claim 6, Corbaton et al. discloses a method comprising:

receiving (section 0034) a first signal including at least one known pilot symbol;

performing equalization (section 0049) on the first signal to form at least one soft estimated symbol; and

remodulating (see section 0050) the at least one estimated symbol to form a second signal; and

performing channel decoding (see sections 0049-0050).

Corbaton does not disclose estimating a DC level of the first signal; remodulating the at least one estimated symbol to form a second signal; re-estimating the DC level by comparing the first signal and the second signal; calculating an initial DC estimation error by comparing

estimates of the DC level of the first signal and re-estimates of the DC level; weighting the at least one estimated symbol, wherein weighting comprises increasing a weight when the initial DC estimation error is below a threshold.

However, Driesen et al. discloses estimating a DC level of a received signal in a DC estimator (see Fig. 3, block 330), wherein a DC offset is determined by comparing the DC level of the received signal to a DC level of a re-modulated version of the demodulated (estimated) signal (see section 0026). Driesen et al. further discloses re-estimating a DC level (estimating a DC offset) by comparing the DC level of the received signal to a DC level of a re-modulated version of the demodulated (estimated) signal (see section 0026). Driesen et al. also discloses compensating (weighting) signals to correct for DC offset using DC offset estimation (see sections 0043-0044). It would have been obvious to one skilled in the art to modify Corbaton with the teachings of Driesen et al. since Driesen et al. states DC offset estimation can lead to the reduction of distortion due to DC offset (see column 0007).

Zvonar further discloses calculating an initial DC offset estimate for a burst and then re-estimating (upadating) the DC offset estimate for each burst by means of an error function (see section 0077). Zvonar further discloses calculating a DC offset estimation error by analyzing (comparing) 1000 bursts (see section 0095). Therefore, it would have been obvious to one skilled in the art at the time the invention was made to calculate an estimation error in Corbaton et al. and Driesen et al. using DC offsets and updated (re-estimated) DC offsets of bursts as disclosed by Zvonar since Zvonar states calculating an estimation error can quantify a performance improvement (see section 0095).

Blanksby et al. further discloses increaseing weighting of a received signal in a filter by increasing the coefficients (weights) applied to the signal when a channel quality metric (such as DC offset) is below a predetermined threshold, which indicates a low quality channel (see column 21, lines 1-5). Therefore, it would have been obvious to one skilled in the art at the time the invention was made to modify the weighting of Corbaton et al., Driesen et al. and Zvonar with the weighting of Blanksby et al. to reduce power consumption in the device (see column 20, lines 47-67).

Regarding claim 8, Corbaton et al. discloses receiving a pilot (training) sequence of symbols (see section 0034).

Regarding claim 9, Corbaton et al., Driesen et al., Zvonar, and Blanskby et al. do not specifically disclose repeating the listed actions (see rejection of claims 1 and 8) for a GSM signal. However, it would have been obvious to repeat the listed actions for a GSM signal since Driesen et al. states DC offset estimation can lead to the reduction of distortion due to DC offset (see column 0007).

Regarding claim 30, Corbaton et al. discloses receiving a pilot (training) sequence of symbols (see section 0034).

Regarding claim 31, Corbaton et al., Driesen et al., Zvonar, and Blanskby et al. do not specifically disclose repeating the listed actions (see rejection of claims 1 and 8) for a GSM signal. However, it would have been obvious to repeat the listed actions for a GSM signal since Driesen et al. states DC offset estimation can lead to the reduction of distortion due to DC offset (see column 0007).

4. Claims 10, 11, and 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lindoff (previously cited in Office Action 1/17/2007) in view of Driesen et al. (previously cited in Office Action 1/17/2007) and in further view of Blanksby et al. (U. S. Patent No. 6, 744, 814)

Regarding claim 10, Lindoff discloses a method comprising:

receiving a signal (see column 4, lines 13-24) that includes a training sequence of symbols;

estimating a channel parameter (DC) from the signal (see column 4, lines 40-43); and

performing (see column 5, lines 4-13) equalization to produce estimated symbols; and

performing channel decoding (see column 3, lines 6-25).

Lindoff does not disclose remodulating the estimated symbols and re-estimating the channel parameter; calculating an initial estimation error by comparing results from estimates of the channel parameter and re-estimating the channel parameter; weighting the estimated symbols, wherein weighting comprises reducing a weight when the initial estimation error is above a threshold.

However, Driesen et al. discloses estimating a DC level of a received signal in a DC estimator (see Fig. 3, block 330), wherein a DC offset (error) is determined by comparing the DC level of the received signal to a DC level of a re-modulated version (re-esitimation) of the demodulated (estimated) signal (see section 0026). Driesen et al. further discloses re-estimating a DC level (estimating a DC offset) by comparing the DC level of the received signal to a DC level of a re-modulated version of the demodulated (estimated) signal (see section 0026). Driesen et al. also discloses compensating (weighting) signals to correct for DC offset using DC offset estimation (see sections 0043-0044). Therefore, it would have been obvious to one

skilled in the art at the time the invention was made to modify the method of Lindoff with the DC offset estimation as disclosed by Driesen et al. since Driesen et al. states DC offset estimation can lead to the reduction of distortion due to DC offset (see column 0007).

Blanksby et al. further discloses reducing weighting of a received signal in a filter by reducing the coefficients (weights) applied to the signal when a channel quality metric (such as estimation error) is above a predetermined threshold, which indicates a high quality channel (see column 20, lines 63-67). Therefore, it would have been obvious to one skilled in the art at the time the invention was made to modify the weighting of Lindoff and Driesen et al. with the weighting of Blanksby et al. to reduce power consumption in the device (see column 20, lines 47-67).

Regarding claim 11, Lindoff discloses the channel parameter is a DC level of the signal (see column 4, lines 40-43).

Regarding claim 17, Lindoff , Driesen et al., and Blanksby do not specifically disclose the signal is a GSM signal. However, it would have been obvious to repeat the listed actions of claim 10 for a GSM signal since Driesen et al. states DC offset estimation can lead to the reduction of distortion due to DC offset (see column 0007).

5. Claim 15 is rejected under 35 U.S.C. 103(a) as being unpatentable over Lindoff (previously cited in Office Action 1/17/2007) in view of Driesen et al. (previously cited in Office Action 1/17/2007) in view of Blanksby et al. (U. S. Patent No. 6, 744, 814) as applied to claim 10, and in further view of Hwang (previously cited in Office Action 1/17/2007).

Regarding claim 15, Lindoff, Driesen et al., and Blanksby et al. do not disclose re-performing equalization if the intial DC estimation error is above a threshold.

However, Hwang discloses measuring an amplitude variation of DC offset for every received signal (see Abstract). Hwang further discloses performing an estimation error (difference) based on the maximum and minimum DC values (see section 0020). This difference is compared to a threshold and if the difference is greater than the threshold, the operational mode of the equalizer is changed (see section 0020). Therefore, it would have been obvious to one skilled in the art at the time the invention was made to re-perform the equalization of Lindoff, Driesen et al., and Blanksby et al. based on a DC estimation difference as disclosed by Hwang since Hwang states the method improves error performance (see section 0021).

6. Claims 12 and 13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lindoff (previously cited in Office Action 1/17/2007) in view of Driesen et al. (previously cited in Office Action 1/17/2007) in view of Blanksby (U. S. Patent No. 6, 744, 814) as applied to claim 10, in further view of Jalali et al. (previously cited in Office Action 1/17/2007).

Regarding claims 12 and 13, Lindoff, Driesen et al., and Blanksby et al. do not disclose the channel parameter is a carrier to interference ratio or a noise spectrum.

However, Jalali et al. discloses estimating a carrier to interference ratio (C/I), wherein the interference is a noise spectrum (see column 15, lines 15-50) for adjustment of coefficients of an equalizer (see column 19, lines 26-31 and column 20, lines 35-43). Therefore, it would have been obvious to one skilled in the art at the time the invention was made to use C/I estimates in the equalizer of Lindoff, Driesen et al., and Blanksby et al. to adjust the coefficients as disclosed by Jalali et al. since Jalali et al. states coefficient adjustment adapts the coefficients to minimize noise and ISI in the equalizer (see column 20, lines 35-38).

7. Claims 18 and 21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Corbaton et al. (previously cited in Office Action 1/17/2007) in view of Tanada (previously cited in Office Action 1/17/2007) and in further view of Blanksby et al. (U. S. Patent No. 6, 744, 814)

Regarding claim 18, Corbaton et al. discloses an apparatus (Fig. 1C) including a computer readable medium adapted to hold machine-accessible instructions (see section 0065) that when accessed result in a machine performing:

remodulating (section 0050) a sequence of symbols from soft decisions from an equalizer; and

calculating an estimation error (MSE) (see section 0051) from received signal samples and remodulated signal samples.

Corbaton et al. does not disclose weighting the soft decisions in part by the estimation error or the sequence of symbols are training symbols, wherein weighting the soft decisions comprises increasing a weight when the estimation error is small.

However Tanada discloses remodulating a sequence of known (training) signals (see section 0130), calculating an estimation error by subtracting the remodulated signals from detected signals (see section 0131), and weighting soft decisions using the result of the subtraction to generate a soft decision correction value (see section 0131). Therefore, it would have been obvious to one skilled in the art to weight the soft decisions in Corbation using the estimation error as disclosed by Tanada since Tanada states correcting the soft decisions makes it possible to obtain decoded data with small error (see section 0132).

Blanksby et al. further discloses increasing weighting of a received signal in a filter by increasing the coefficients (weights) applied to the signal when a channel quality metric (such as

estimation error) is below a predetermined threshold, which indicates a low quality channel (see column 21, lines 1-5). Therefore, it would have been obvious to one skilled in the art at the time the invention was made to modify the weighting of Corbaton et al. and Tanada with the weighting of Blanksby et al. to reduce power consumption in the device (see column 20, lines 47-67).

Regarding claim 21, Blanksby et al. further discloses reducing weighting of a received signal in a filter by reducing the coefficients (weights) applied to the signal when a channel quality metric (such as estimation error) is above a predetermined threshold, which indicates a high quality channel (see column 20, lines 63-67). Therefore, it would have been obvious to one skilled in the art at the time the invention was made to modify the weighting of Lindoff and Driesen et al. with the weighting of Blanksby et al. to reduce power consumption in the device (see column 20, lines 47-67).

8. Claim 19 is rejected under 35 U.S.C. 103(a) as being unpatentable over Corbaton et al. (previously cited in Office Action 1/17/2007) in view of Tanada (previously cited in Office Action 1/17/2007) in view of Blanksby et al. (U. S. Patent No. 6, 744, 814) as applied to claim 18, and in further view of Driesen et al. (previously cited in Office Action 1/17/2007).

Regarding claim 19, Corbaton et al., Tanada, and Blanksby et al. do not disclose calculating an estimation error comprises comparing an estimation of a DC level of the received samples to a DC level of remodulated signal samples.

However, Driesen et al. discloses estimating a DC level of a received signal in a DC estimator (see Fig. 3, block 330), wherein a DC offset (estimation error) is determined by comparing the DC level of the received signal to a DC level of a re-modulated version of the

demodulated (estimated) signal (see section 0026). Therefore, it would have been obvious to one skilled in the art at the time the invention was made to modify the method of Corbaton et al., Tanada, and Blanksby et al. with the DC offset estimation as disclosed by Driesen et al. since Driesen et al. states DC offset estimation can lead to the reduction of distortion due to DC offset (see column 0007).

9. Claims 22, 24, 26, and 28 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lindoff (previously cited in Office Action 1/17/2007) in view of Tanada (previously cited in Office Action 1/17/2007) and in further view of Blanksby et al. (U. S. Patent No. 6, 744, 814).

Regarding claim 22, Lindoff discloses an apparatus comprising:

a parameter estimator (Fig. 2, blocks 205 and 207, see column 4, lines 40-54) adapted to estimate DC offset; and

an equalizer (Fig. 2, block 209, see column 5, lines 4-20) coupled to the parameter estimator, the equalizer adapted to equalize a channel based at least in part on the DC estimate (see column 4, lines 4-20) and output decided symbols (see Fig. 2). Lindoff does not disclose a processing element adapted to compare received signal samples and remodulated signal samples, calculate an initial estimation error from the received signal samples and the remodulated signal samples, and to weight soft decision by reducing a weight when the initial estimation error is above a threshold.

However Tanada discloses remodulating a sequence of known (training) signals (see section 0130), calculating an estimation error by subtracting (comparing) the remodulated signals from detected signals (see section 0131), and weighting soft decisions using the result of the subtraction to generate a soft decision correction value (see section 0131). Therefore, it would

have been obvious to one skilled in the art to weight the decided symbols (soft decisions) in Lindoff using the estimation error as disclosed by Tanada since Tanada states correcting the soft decisions makes it possible to obtain decoded data with small error (see section 0132).

Blanksby et al. further discloses reducing weighting of a received signal in a filter by reducing the coefficients (weights) applied to the signal when a channel quality metric (such as estimation error) is above a predetermined threshold, which indicates a high quality channel (see column 20, lines 63-67). Therefore, it would have been obvious to one skilled in the art at the time the invention was made to modify the weighting of Lindoff and Tanada. with the weighting of Blanksby et al. to reduce power consumption in the device (see column 20, lines 47-67).

Regarding claim 24, Lindoff further discloses estimating a DC offset level of the signal (see column 4, lines 40-54).

Regarding claim 26, Lindoff discloses an electronic system (see Fig. 2), comprising:

an omni-directional (see column 1, lines 20-26) antenna for receiving rays from multiple directions

a parameter estimator (Fig. 2, blocks 205 and 207, see column 4, lines 40-54) adapted to estimate DC offset from a signal received from an antenna; and

an equalizer (Fig. 2, block 209, see column 5, lines 4-20) coupled to the parameter estimator, the equalizer adapted to equalize a channel based at least in part on the DC estimate (see column 4, lines 4-20) and output decided symbols (see Fig. 2).

Lindoff does not disclose a processing element adapted to compare received signal samples and remodulated signal samples, calculate an initial estimation error from the received

signal samples and the remodulated signal samples, and to weight soft decision by reducing a weight when the initial estimation error is above a threshold.

However Tanada discloses remodulating a sequence of known (training) signals (see section 0130), calculating an estimation error by subtracting (comparing) the remodulated signals from detected signals (see section 0131), and weighting soft decisions using the result of the subtraction to generate a soft decision correction value (see section 0131). Therefore, it would have been obvious to one skilled in the art to weight the decided symbols (soft decisions) in Lindoff using the estimation error as disclosed by Tanada since Tanada states correcting the soft decisions makes it possible to obtain decoded data with small error (see section 0132).

Blanksby et al. further discloses reducing weighting of a received signal in a filter by reducing the coefficients (weights) applied to the signal when a channel quality metric (such as estimation error) is above a predetermined threshold, which indicates a high quality channel (see column 20, lines 63-67). Therefore, it would have been obvious to one skilled in the art at the time the invention was made to modify the weighting of Lindoff and Tanada. with the weighting of Blanksby et al. to reduce power consumption in the device (see column 20, lines 47-67).

Regarding claim 28, Lindoff further discloses estimating a DC offset level of the signal (see column 4, lines 40-54).

10. Claims 25 and 29 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lindoff (previously cited in Office Action 1/17/2007) in view of Tanada (previously cited in Office Action 1/17/2007) in view of Blanksby et al. (U. S. Patent No. 6, 744, 814) as applied to claims 22 and 26, and in further view of Jalali et al. (previously cited in Office Action 1/17/2007).

Regarding claims 25 and 29, Lindoff, Tanada, and Blanksby et al. do not disclose estimating a carrier to interference ratio of the signal.

However, Jalali et al. discloses estimating a carrier to interference ratio (C/I) for adjustment of coefficients of an equalizer (see column 19, lines 26-31 and column 20, lines 35-43). Therefore, it would have been obvious to one skilled in the art at the time the invention was made to use C/I estimates in the equalizer of Lindoff, Tanada, and Blanksby et al. to adjust the coefficients as disclosed by Jalali et al. since Jalali et al. states coefficient adjustment adapts the coefficients to minimize noise and ISI in the equalizer (see column 20, lines 35-38).

Conclusion

11. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Curtis B. Odom whose telephone number is 571-272-3046. The examiner can normally be reached on Monday- Friday, 8-5.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jay Patel can be reached on 571-272-2988. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Curtis Odom
June 11, 2007